

DROUGHT.

New Ulm, Tex.: the total precipitation for January, February, and March, 1887, 4.36 inches, is 9.39 inches below the average of the same months during the past fifteen years. The total precipitation of the present month, 1.27 inches, is the least that has fallen in any March during that time. The voluntary observer at Corsicana and other places in the eastern part of Texas state that a protracted drought has prevailed since December, 1886.

San Antonio, Tex.: on the 31st the observer at this place reports, concerning the drought in Texas, as follows:

The drought in this section continues, little rain having fallen since the first frost which occurred November 18th; cattle and horses are dying in large numbers, chiefly from want of water. Market reports indicate that the number of fallen hides, or hides from cattle that have died on the range, handled this year has been unprecedentedly large. Several cattle owners in Atascosa and Frio counties are shipping their herds to the Indian Territory for pasturage. The agricultural outlook for this section is decidedly gloomy. Corn is coming up slowly, but if rain does not fall soon it will not make a stand, while oats, barley, and all small grain are regarded as complete failures.

Fort Grant, Ariz.: the observer at this place reports the total rainfall of the month to be a few drops on the 22d. The soil at the end of the month was exceptionally dry for the season and rain was needed badly. This section of the territory depends, from spring until early autumn, for its supply of water on the melted snow from the Graham Mountains, about five miles northeast of station. These mountains are usually

covered with snow at this season of the year. The absence of unmelted snow in this range during the present month indicates a severe drought for the coming summer, which will greatly damage the extensive cattle interests of this vicinity.

Fort Smith, Ark.: at the end of the month throughout Arkansas and the Indian Territory, vegetation of all kinds was suffering from lack of rain. Farmers stated that the ground was too hard to plow, and that crops already planted would be a failure unless rain fell shortly. The Arkansas River was very low and the cotton and lumber industries of this town were at a standstill, awaiting a rise in the river. Navigation was practically closed at all river ports above this place. The Canadian River in the Indian Territory, a tributary of the Arkansas, was lower than it has ever been before within the memory of the oldest settlers.

Wellington, Kans.: the voluntary observer at this place states that the month has been exceedingly dry, the total precipitation being only 0.22 inch. The growth of vegetation of all kinds was greatly delayed by want of moisture. At Salina the total fall of the month was only 0.01 inch, and crops were beginning to feel the effects of the drought.

Key West, Fla.: on the 12th, during a thunder-storm, 1.36 inches of rain fell; this rain ended a drought that had prevailed for several months and relieved the people of many inconveniences and discomforts. It was the only heavy rainfall since October 26, 1886, and the majority of the cisterns of the town had become dry.

WINDS.

Report of tornadoes for the month of March, 1887, by Lieut. John P. Finley, Signal Corps, U. S. Army, Assistant.

Place.	Date.	Time.	Direction.	Form of cloud.	Number of persons killed.	Number of persons wounded.	Width of path.	Number and kind of animals killed.	Number and kind of buildings destroyed.	Total valuation of property destroyed.	Authority.
Tampa, Fla.	17	5 p. m.	ne.	.....	2	Several	Feet. Narrow	None	Several houses.....	\$10,000	J. G. Knapp, Limona, Fla.; "New York World," March 19, 1887.
Topin's Grove and Ripley, W. Va.	24	4.30 p. m.	ne.	Funnel	None	None	1,720	.....	Court house and residences.	.....	N. A. Duffield, Rock Castle; P. B. Vanham, Topin's Grove, W. Va.
Burton, W. Va.	24	6.30 p. m.	ne.	.....	None	None	.....	None	10 houses and barns besides many unroofed; fences demolished.	.....	A. V. McDonnell, Burton, W. Va.
Hockingport, Ohio	24	4 p. m.	ne.	.....	None	None	.....	None	Several	.....	Neal White, Hockingport, Ohio.
Vinton, Ohio	24	5 p. m.	ne.	.....	None	None	.....	None	Several	.....	Hiram Wilcox, Vinton, Ohio.
Point Pleasant, W. Va.	24	5 p. m.	ne.	.....	None	None	Narrow	.....	10 houses unroofed, fences destroyed, and timber blown down.	.....	F. D. Hay, Point Pleasant, W. Va.
Tyler Creek, W. Va.	24	5 p. m.	ne.	.....	None	Several	Narrow	.....	Houses unroofed and trees prostrated.	.....	F. M. Swann, Tyler Creek, W. Va.
Ripley, W. Va.	24	6 p. m.	ne.	.....	.....	.....	Narrow	None	Court house and other buildings.	2,800	Jackson County "Herald," W. Va.
Lincoln, Ohio	24	4 to 8 p. m.	ne.	.....	None	None	Narrow	None	Great destruction of property.	.....	M. M. Walter, Lincoln, Ohio.
Murraysville, W. Va.	24	About 4 p. m.	ne.	Funnel	.....	.....	Narrow	.....	.....	.....	D. K. Barrett, Murraysville, W. Va.
Evergreen, Ohio	24	About 5 p. m.	easterly	.....	.....	.....	.....	.....	12 to 15 buildings destroyed, with damage to other property.	.....	J. H. Morris, Evergreen, Ohio.
Roney's Point, W. Va.	24	5.30 p. m.	ne.	.....	.....	.....	Narrow	None	Buildings unroofed and other damage.	.....	Thomas J. Orr, Roney's Point, W. Va.
Pilot Point, Tex.	26	5.30 p. m.	ne.	.....	None	None	Narrow	None	Very destructive.	.....	J. B. Pondron, Pilot Point, Tex.
Bigbyville, Tenn.	27	4.30 p. m.	ne.	.....	.....	.....	90	None	Very destructive.	.....	O. F. Williams, Ashwood, Tenn.
Bartow and near Moxley, Ga.	31	6 p. m.	ne.	Funnel	None	None	600 to 900	None	Considerable damage to houses, timber, and fences.	.....	W. H. H. Stewart, Bartow; James A. Thigpen, Wadley; B. S. Carswell, Moxley, Ga.

a A large and very dark cloud, covering the nw. horizon and moving rapidly from nw. to se. and then e. Storms of this character very uncommon in this locality.

b A large quantity of water in the Ohio River was lifted by the force of the wind and carried some two hundred and fifty yards.

c The funnel-shaped cloud appeared in the w., having a light color at the lower end and very dark above. There was a heavy roaring noise on the approach of the storm.

d A copper-colored cloud was seen to approach from the nw., preceded by light, feathery clouds.

e Two very dark clouds, one from sw. and the other from the w., rolled and tumbled in wild commotion, accompanied by loud noise, and then moved to the e.

f Cloud first formed twenty miles sw. of Bartow.

The most frequent directions of the wind during March, 1887, are shown on chart ii by the arrows flying with the wind; they are also given in the table of miscellaneous data. The general movement of the air over the eastern half of the

country, except in Florida and the Gulf States, has been from the northwest; along the coast of Washington Territory and Oregon, from the south or southwest. In other parts of the country the wind-direction was variable.

HIGH WINDS.

[In miles per hour.]

Wind-velocities of fifty or more miles per hour, other than the maximum velocities for the month, which are given in the table of miscellaneous data:

Mount Washington, N. H., 68, nw., 1st; 80, w., 2d; 88, w., 3d; 80, nw., 4th; 68, nw. 5th; 70, sw., 6th; 90, w., 8th; 60, w., 9th; 66, n., 11th; 58, e., 12th; 52, ne., 15th; 50, e., 18th; 80, e. 22d; 88, w., 23d; 80, nw., 24th; 100, nw., 26th; 90, nw., 27th; 80, sw., 28th; 52, se., 29th; 102, nw., 30th; 81, nw., 31st.

Pike's Peak, Colo., 56, w., 1st; 50, nw., 2d; 60, sw., 3d; 60, nw., 6th; 64, w., 8th; 67, sw., 14th; 52, w., 19th; 56, nw., 20th; 56, nw., 23d; 64, nw., 24th; 62, w., 25th; 52, nw., 27th; 62, n., 28th.

Fort Totten, Dak., 52, s., 4th.

Fort Elliott, Tex., 50, nw., 8th.

Fort Maginnis, Mont., 52, w., 10th; 54, nw., 12th; 56, nw., 18th.

Valentine, Nebr., 60, nw., 12th; 54, nw., 19th.

Fort Buford, Dak., 52, nw., 12th.

Fort Assinaboine, Mont., 52, nw., 12th.

INLAND NAVIGATION.

STATE OF WATER IN RIVERS AND HARBORS.

In the following table are shown the danger-points at the various river stations; the highest and lowest depths for March, 1887, with the dates of occurrence, and the monthly ranges:

Heights of rivers above low-water mark, March, 1887.

[Expressed in feet and tenths.]

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River:</i>						
Shreveport, La.	29.9	19	18.4	31	14.7	3.7
<i>Arkansas River:</i>						
Fort Smith, Ark.	22.0	11	5.6	29, 30, 31	1.7	3.9
Little Rock, Ark.	23.0	9	10.4	31	3.0	7.4
<i>Missouri River:</i>						
Omaha, Nebr.	18.0	28	17.9	24	9.1	8.8
Leavenworth, Kans.	20.0	30, 31	18.2	1	6.6	11.6
<i>Mississippi River:</i>						
Saint Paul, Minn.	14.5	25, 26	7.9	22	6.9	1.0
La Crosse, Wis.	24.0	17	6.3	10	4.5	1.8
Dubuque, Iowa	16.0	13	9.0	26-30	5.8	3.2
Davenport, Iowa	15.0	10, 13	8.4	31	4.7	3.7
Keokuk, Iowa	14.0	16	10.4	2	4.3	6.1
Saint Louis, Mo.	32.0	19, 31	20.0	4	13.0	7.0
Cairo, Ill.	40.0	9, 10	48.6	31	22.1	26.5
Memphis, Tenn.	34.0	10, 11, 13-18	36.4	31	23.6	12.8
Vicksburg, Miss.	41.0	26-31	44.7	1	42.1	2.6
New Orleans, La.	13.0	30	14.7	1, 2	12.9	1.8
<i>Ohio River:</i>						
Pittsburg, Pa.	22.0	8	13.1	25, 27	3.0	10.1
Cincinnati, Ohio	50.0	1	54.6	30	12.9	41.7
Louisville, Ky.	25.0	2	32.0	31	6.4	25.6
<i>Cumberland River:</i>						
Nashville, Tenn.	40.0	2	44.2	30	6.4	37.8
<i>Tennessee River:</i>						
Knoxville, Tenn.		9	11.8	27, 30, 31	2.4	9.4
Chattanooga, Tenn.	33.0	1	27.3	31	5.2	22.1
<i>Savannah River:</i>						
Augusta, Ga.	32.0	10	18.2	27, 28	7.3	10.9
<i>Mobile River:</i>						
Mobile, Ala.		31	17.0	22	14.9	2.1
<i>Sacramento River:</i>						
Red Bluff, Cal.		18	7.0	1	2.1	4.9
Sacramento, Cal.		29	20.5	1, 2, 3	15.5	5.0
<i>Willamette River:</i>						
Portland, Oregon		10	14.1	5	3.0	11.1

a Record for 20 days.

b Record for 21 days.

Mississippi River.—Dubuque, Iowa: on the 10th the ice in the river moved about two hundred feet; on the 12th it began breaking up and moving out rapidly; on this date the transfer steamer "Campbell" made her first regular trip and navigation was considered opened. From the 12th to the 16th large quantities of ice passed down.

Davenport, Iowa: on the 7th the ice in the river opposite the city moved in a mass about one hundred feet, on the 8th about two hundred feet; it began breaking up rapidly on the 9th and 10th and moved down the river slowly. From the 11th to the 14th, inclusive, large quantities of ice passed down. The first boat of the season, the steamer "Wes Rambo," arrived on the 14th.

Keokuk, Iowa: the steamer "Josephine," the first boat of the season, arrived on the 18th.

Cairo, Ill.: the water in the river at this point reached its highest stage on the 9th and 10th, when it was 48.6 feet above the low-water mark; from the 10th until the end of the month it subsided slowly, being 22.1 feet above on the 31st. On the 7th

the Missouri Pacific Railroad trains were shut out from their transfer landing at Bird's Point, Mo., the tracks being covered with water and heavy driftwood.

Memphis, Tenn.: the river remained high throughout the month, reaching its highest stage, 36.4 feet above low-water mark, on the 10th, 11th, 13th, and 18th; this is 0.4 foot higher than any other flood on record at this station. The observer states that from February 16th until March 25th the river was 34.0 feet above the danger-line, but that it did no damage in the immediate vicinity of Memphis, except slightly interrupting traffic and submerging the lower floors of houses.

Missouri River.—Fort Buford, Dak.: the Missouri River at this point remained frozen until the 11th, when the ice below the mouth of the Yellowstone began breaking up. At Rocky Point, Mont., the ice gorged and the river rose thirty-five feet in twelve hours, flooding the warehouse of the Benton Transportation Company, damaging some stores. Above the mouth of the Yellowstone the ice did not break up until the 16th, when it began running out freely, but the water rose rapidly until the 18th, from that date until the end of the month the flood subsided slowly and large quantities of ice passed down.

Leavenworth, Kans.: the water in the river rose steadily from the 1st to 30th, on the latter date and the 31st it remained stationary at 18.2 feet above low-water mark. On the 1st and 2d large quantities of ice passed down. During the remaining days of the month the river at this point was clear of ice, but a considerable amount of driftwood was noted.

At Omaha and Brownville, Nebr., Yankton and Fort Randall, Dak., the ice in the river broke up and commenced floating down on the 12th. On the 22d the river overflowed its banks at Fort Randall and flooded the bottom lands.

Lake Michigan.—Milwaukee, Wis.: the heavy northerly gales of the month drove the ice in the lake southward, and large fields of it still remained in the southern end of the lake at the close of the month. Several vessels left this port on the 30th for Chicago, but were obliged to return, being unable to force a passage through the heavy ice off Racine Point.

Grand Haven, Mich.: the schooner "Jennie Mullen," from Chicago, arrived at this port on the morning of the 10th; this was the first sailing vessel to arrive this season. On the above date the lake was nearly clear of ice, and craft of all kinds were getting ready to leave port at an early date.

Escanaba, Mich.: at the end of the month Little Bay de Noquet and adjacent waters were still covered with three feet of hard ice. The following, from the records of the Signal Office, shows the dates of opening and closing of navigation at this port for the fifteen years from 1872 to 1886:

Years.	Opened.	Closed.	Years.	Opened.	Closed.
1872	April 28	Nov. 30	1880	April 13	Nov. 29
1873	May 2	Dec. 10	1881	May 4	Dec. 5
1874	April 30	Nov. 30	1882	April 1	Dec. 1
1875	May 4	Dec. 1	1883	April 24	Dec. 8
1876	April 27	Dec. 9	1884	April 9	Dec. 9
1877	April 18	Jan. 25, 1878	1885	May 5	Dec. 1
1878	March 5	Dec. 29	1886	April 23	Dec. 6
1879	April 25	Dec. 12			